

# **Study & Research Activities at VU**



**Lunch-time Seminar**

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# VU?

- ❑ **Vrije Universiteit, Amsterdam**
  - **In English, Free University of Amsterdam**



# Study Programs in Computer Science at VU

## ☐ Bachelors – 3 years

- Mainly in Dutch
- Covers areas of CS and Math

## ☐ Masters – 2 years

- 1 year master programs for EU exchange students
- 2 year programs offer master degrees in,
  - Information Sciences
  - Artificial intelligence
  - Computer Science
  - Bioinformatics
  - Parallel and distributed computer systems (topmaster)
  - Business mathematics and informatics

## ☐ Doctorate – 4 years

- Work related to EU and NL projects plus internships



# What is Topmaster?

- ☐ A specialized master program, which spans for two years
- ☐ Major components of the programs involves research and practical work
- ☐ There are a few basic theory (taught) courses
- ☐ Should have 120 ECTS, which includes 25% of research thesis and 50% of other research+practical work



# **Master Degree in Parallel and Distributed Computer Systems (PDCS)**

## **❑ Basic theory components**

- **Distributed Systems**
- **Parallel Programming**
- **Network Security**

## **❑ Advanced components**

- **Distributed Algorithms or Protocol Validation or Coding and Complexity**
- **Performance analysis of communication networks**

## **❑ Research + Practical components**

- **Operating Systems or Compiler Construction or Network Programming**
- **Cluster and Grid Computing**
- **Advanced Topics in Distributed Systems**
- **Advanced Topics in Computer Security**
- **Research Proposal Preparation**
- **Master's Project**



# Some staff members I worked with

- ☐ Prof. Henri Bal
- ☐ Prof. Maarten van Steen
- ☐ Prof. Andrew Tanenbaum
- ☐ Prof. Gusti Eiben
- ☐ Dr. Herbert Bos
- ☐ Dr. Chandana Gamage





# Research at VU

## ❑ CVS (Concurrent Versioning System)

- By Dr. Dick Grune



- I created CVS to be able to cooperate with my students Erik Baalbergen and Maarten Waage on the ACK (Amsterdam Compiler Kit) C compiler. The three of us had vastly different schedules (one student was a steady 9-5 worker, the other was irregular, and I could work on the project only in the evenings). Their project ran from July 1984 to August 1985. CVS was initially called cmt, for the obvious reason that it allowed us to commit versions independently.
- CVS has won the USENIX STUG Award 2003



# Research at VU...

## □ Minix

- A modular, microkernel based OS
- Current version 3
- Includes X and many other tools like gcc, bash, gzip, perl, python, vim and many more
- Currently many more are being ported, like java and gnumake





# Research at VU...

## ❑ Orca Parallel Programming Language

- a for parallel programming on distributed systems, based on the shared data-object model.
- Though not used widely now, it was the basis for many grid related research at VU and Europe



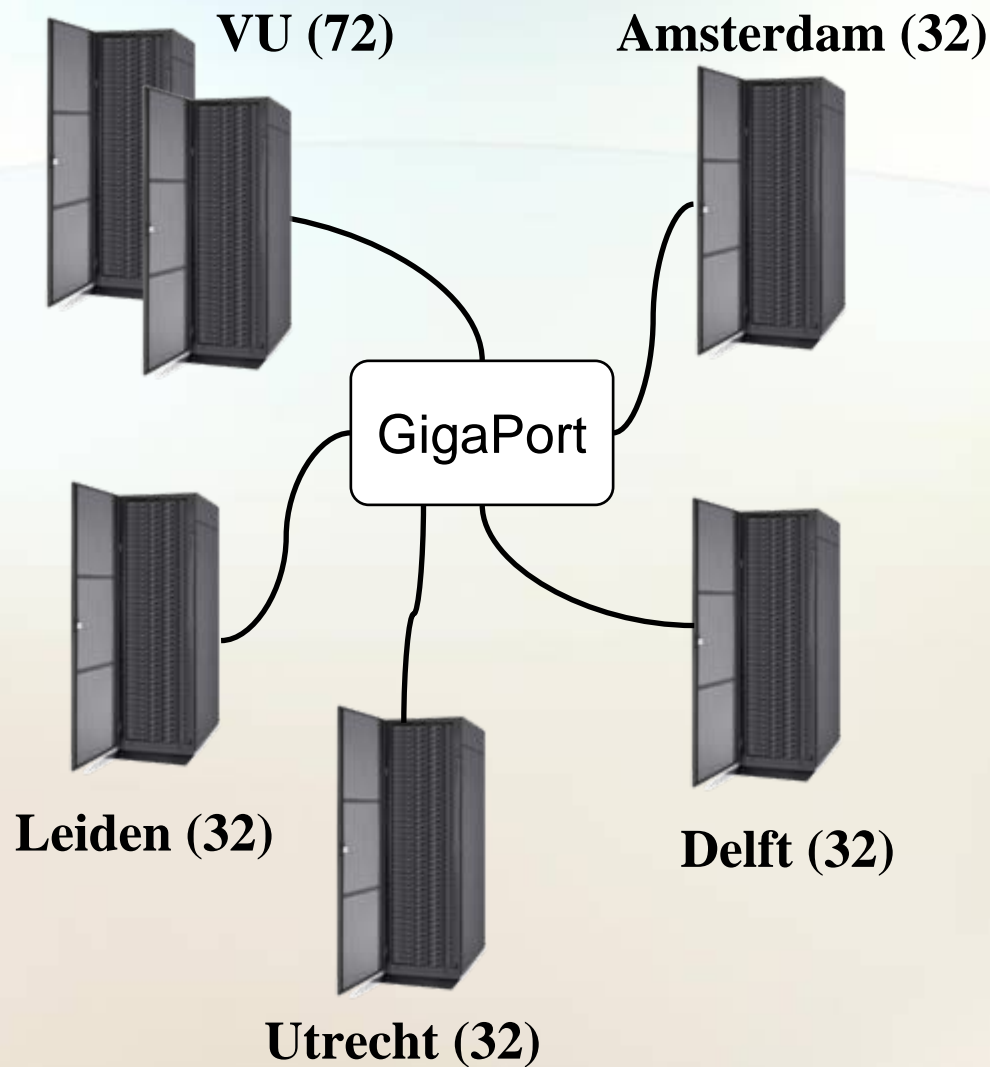
# Research at VU...

- ❑ **Distributed ASCI Supercomputer 2 (DAS-2)**
  - DAS-2 is a wide-area distributed computer of 200 Dual Pentium-III nodes. The machine is built out of clusters of workstations, which are interconnected by SurfNet, the Dutch university Internet backbone for wide-area communication, whereas Myrinet, a popular multi-Gigabit LAN, is used for local communication
  - The clusters are located at five Dutch Universities:
    - Vrije Universiteit, Amsterdam - 72 nodes
    - Leiden University - 32 nodes
    - University of Amsterdam - 32 nodes
    - Delft University of Technology - 32 nodes
    - University of Utrecht - 32 nodes



# Research at VU...

## □ DAS2...



# Research at VU...

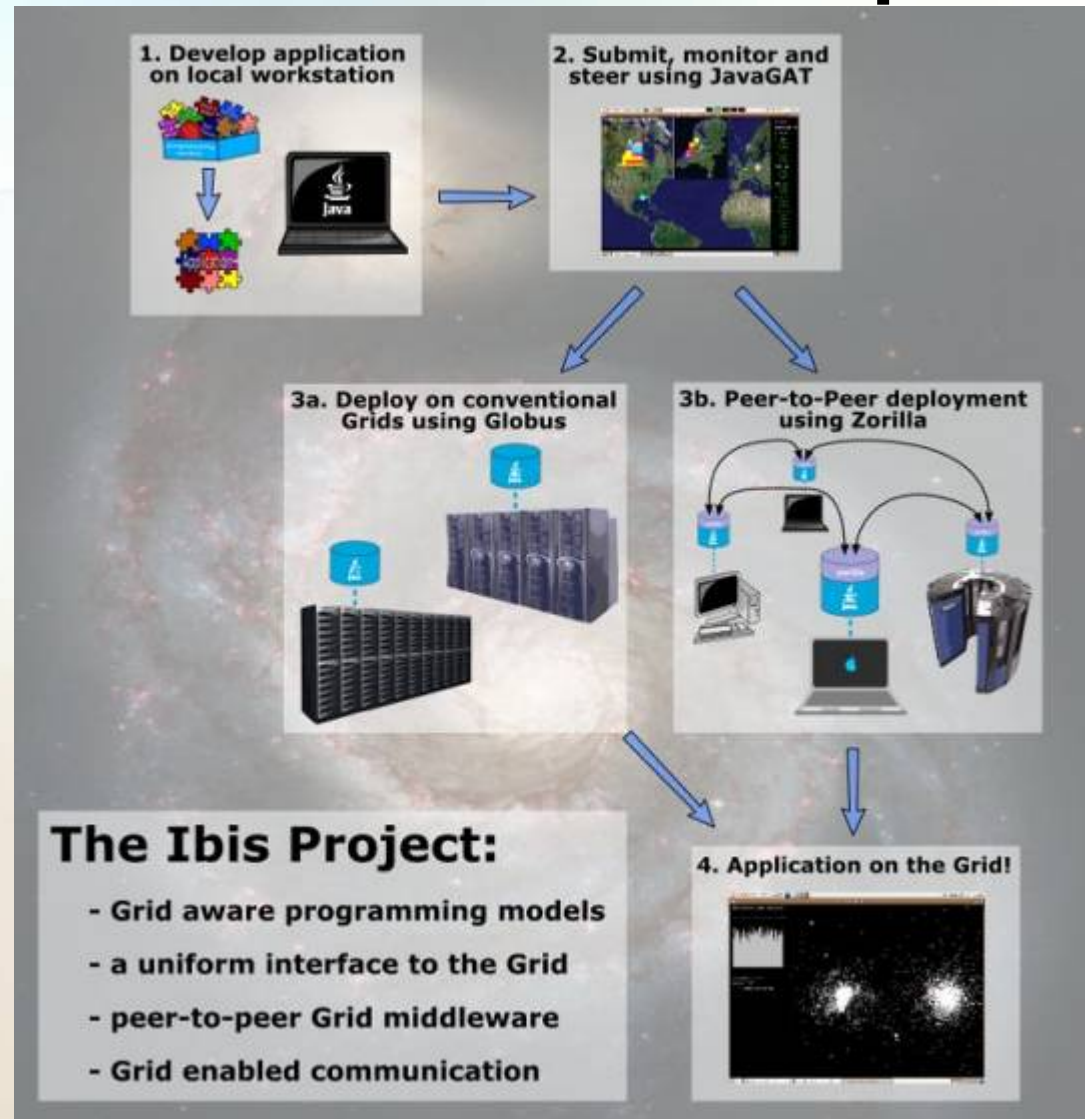
## □ Gridlab

- **GAT**: a set of coordinated, generic and flexible APIs for accessing Grid services
- **Gridsphere**: portal framework provides an open-source portlet based web portal
- **GRMS**: a job scheduling and resource management framework, which allows users to build and deploy job and resource management systems for Grids.



# Research at VU...

## ❑ Ibis: Java-Based Grid Computing



# Research at VU...

## ❑ Globule: an Open-Source Content Distribution Network

- Globule is a third-party module for the Apache Web server that allows a given server to replicate its documents to other Globule servers.
- It takes care of maintaining consistency between the replicas, of monitoring the servers, and of automatically redirecting clients to one of the available replicas.
- Globule also supports the replication of PHP documents. It runs on Unix and Windows systems.



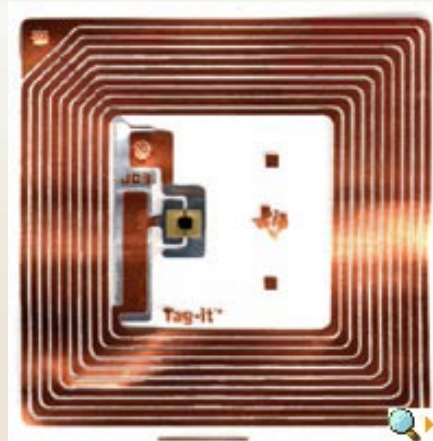


# Research at VU...

## ❑ RFID based research with collaboration with Philips

### ▪ RFID guardian project

- mobile battery-powered device that offers personal RFID security and privacy management



# Research at VU...

- ❑ **Many more in areas of,**
  - **Sensor networks**
  - **P2P computing**
  - **Computer networks (specially gigabit WANs)**
  
- ❑ **These are only the ones done by the Computer Systems Research group**



# Edsger W. Dijkstra (1930–2002)

- ❑ Edsger Wybe Dijkstra was one of the most influential members of computing science's founding generation.
- ❑ Among the domains in which his scientific contributions are fundamental are
  - algorithm design
  - programming languages
  - program design
  - operating systems
  - distributed processing
  - formal specification and verification
  - design of mathematical arguments



- ❑ During his forty-plus years as a computing scientist, which included positions in both academia and industry, Dijkstra's contributions brought him many prizes and awards, including computing science's highest honor, the ACM Turing Award.



# My research work

## □ Adaptive Distributed Evolutionary Algorithms

- Joint research with Computer Systems and Artificial Intelligence research groups
- Deploying of an Evolutionary Algorithm on a P2P network
- This was able to adapted to the surrounding environment and find solutions to the N Queens problem
- Research paper for ACM GECCO (under review)





# Life in Amsterdam



**Dank je wel  
en  
tot ziens**